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# THE NURSE IN HOT CLIMATES

REVISED AND REPRINTED FROM  
'THE HOSPITAL' JOURNAL

BY

EDWARD HENDERSON, M.D., F.R.C.S. Edin.

LATE OF SHANGHAI, CHINA

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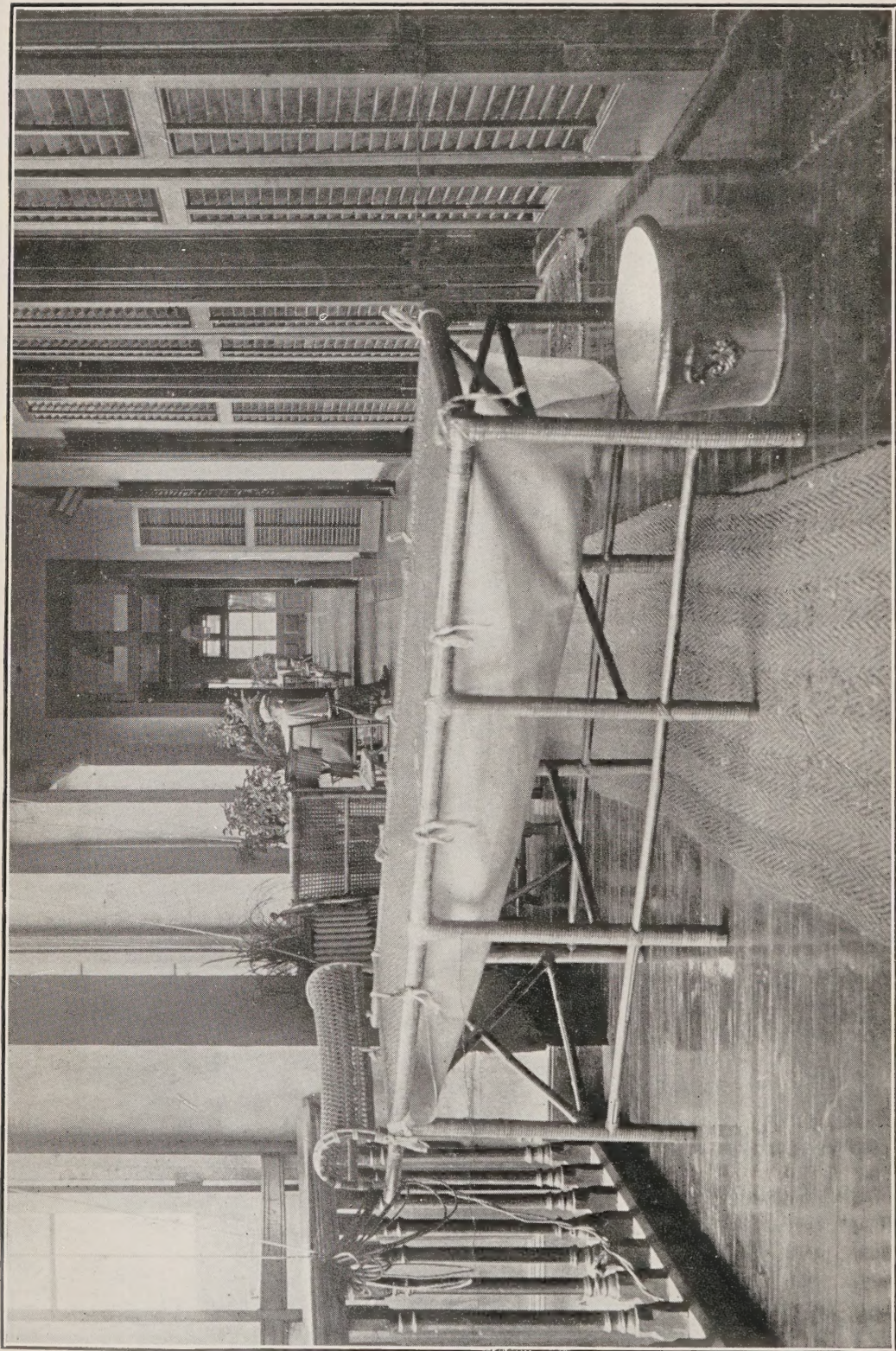


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*Bamboo Couch, adapted for the Treatment of Heat Apoplexy or other Hyperpyrexia.*



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# THE NURSE IN HOT CLIMATES.

BY

EDWARD HENDERSON, M.D., F.R.C.S. Edin.,  
late of Shanghai, China.

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THE attention given of late years in England to the study of disease as manifested in hot climates renders it unnecessary for me to offer any apology for making the duties of the nurse in regard to these maladies a subject for separate discussion. Doubtless the trained nurse who has gained her experience in the wide field of general practice provided by a large hospital in England is already very fully instructed in all essential matters relating to the care of her cases, and if called on to exercise her profession abroad would soon, and on most occasions of her own initiative, make those modifications in practice which constitute the difference between nursing in London and Calcutta. But even she may find an advantage in hearing the more important points formulated beforehand, and learning something from the experience of others regarding the difficulties to be encountered, and the means by which these may best be overcome.

## SELECTION—AGE.

The age of the nurse herself is of importance; for it is a matter of common experience that such a

radical change of the conditions of life as residence in the East implies is less well borne by very young women and by women who have passed middle life. As a general rule, the nurse who goes abroad for the first time should not be under twenty-five, and not over thirty-six, years of age.

#### MEDICAL EXAMINATION.

Examination by a competent medical man as to health-fitness is usually made a condition of the nurse's engagement, and even when this is not done the precaution is one which should never be neglected. In regard to such examinations it may be stated generally, that any departure from health which would lead to rejection or delayed acceptance of a life proposed for insurance on ordinary terms would constitute unfitness in a nurse for work in the tropics; and it is manifestly in the interest of the nurse herself that the discovery of any condition of the kind should be made early. A delicate physique, especially when associated with what is commonly spoken of as defective circulation—the hands and feet being habitually cold—is an unfavourable condition; and so too is a history of recurrent catarrhal affections of the intestinal mucous membrane: though perhaps neither of these constitutes positive unfitness. In selecting nurses for work in the East, a previous history of certain forms of acute illness should receive attention: thus, other things being equal, the nurse who has already had scarlet and enteric fevers would be in a better position to go abroad than the one who had not previously suffered in this way.

#### PROTECTION BY PROPHYLACTIC INOCULATION.

At the present date there are four acute diseases of a serious kind to which the nurse who goes to the East may at any time be specially exposed, but against which, it is believed, a more or less lasting



and effective protection can be obtained, either before she leaves England or when she reaches her destination abroad. These diseases are smallpox, enteric fever, cholera, and plague.

Against smallpox, a thorough primary vaccination done in infancy, if repeated once successfully in adult life, is regarded by many as constituting a sufficient protection. Since however the immediate result of vaccination is trifling, and the operation itself practically free from risk, its repetition every six or seven years is commonly practised. In the case of the nurse going abroad, it is better always to repeat vaccination when two years have elapsed since the date of its last performance, and to revaccinate in every case in which there is reason to believe that the last operation has failed. Although the addition of glycerin and improved methods of preparation have greatly helped to preserve the activity of vaccine, it would seem that its deterioration still takes place more quickly in a hot than in a temperate climate. On this account, and because of the immediate risk incurred when the nurse is brought in contact with natives on board ship and at the various ports of call, it is advisable that she should be vaccinated before she leaves England.

Protection against typhoid fever is sought to be established by the inoculation of an antityphoid "vaccine," a practice inaugurated at Netley in July 1896. Nearly 2,000 of these inoculations were done among the soldiers of English regiments quartered in India, during a period of twelve months beginning in December 1898; and the results obtained were regarded as showing that if the practice were extended over the whole British Army in India, or the susceptible part of it, it would mean an annual saving of 1,000 cases, and nearly 200 lives. Professor Wright, of Netley, in commenting lately on the official returns of the outbreak of typhoid in the garrison of Ladysmith during the siege, expresses the opinion that it is at present



impossible to determine precisely to what extent the inoculated were protected by inoculation, but at the same time speaks of the general results obtained as distinctly encouraging. The operation is one rarely attended by any really serious consequences, but it needs of course care in its performance, and usually entails on the patient a short confinement to the house, or even to bed.

Protection again cholera and plague is got by the prophylactic inoculations introduced by Dr. Haffkine, inoculations which have been apparently used with considerable success in India: in cholera, greatly reducing the number of the cases, though not affecting case-mortality; in plague, reducing the number of the cases, and lowering the death-rate by more than a half. The nurse may, on reaching her destination, decide to make a trial of one or other of these last prophylactics, but the operation is not one which is at all likely, in the present state of our knowledge, to be undertaken before she leaves England.

The duration of the protection said to be obtained from prophylactic inoculations directed against typhoid, cholera, and plague has been variously stated: in the case of typhoid, it has been estimated at from eighteen months to two years; in cholera and plague, it is supposed to last during an epidemic, or for a period of about six months.

#### OUTFIT.

On entering the tropics the nurse must of course be provided with suitable clothing, but anything like a large outfit is a mistake. In most of the towns or districts in the East where European nurses are employed, there are peculiarities of climate, mode of life, and fashion, and the garments worn by the European inhabitants there are those naturally best suited to the varying conditions. Such clothing can generally be easily procured by the nurse on the spot on reaching her destination; if not, the conditions of modern transport will usually make it



a simple matter for her to send to England for what she wants. She will, of course, leave behind her such details as to measurement, &c., as will enable her easily to communicate her wishes to the dealer. No one at the present date who travels on board an ordinary steamer carrying passengers need burden himself with anything like a medicine chest, but a small bottle of aperient pills will be often useful, and is easily carried. While admitting that the effect of "chill" as a cause of illness, other than a simple catarrh, is certainly much less than is generally supposed, it is still right to warn the inexperienced traveller that in the tropics she should provide against sudden changes of temperature by suitable alteration of clothing, in a way she has perhaps scarcely been accustomed to do in England. When the change is one from heat to cold, and, as sometimes happens, occurs suddenly on board ship, she may have some difficulty in doing this; and may be reminded that, in the absence of thicker clothing, she can at once add materially to her comfort and safety by doubling the thin undergarments she is already wearing.

#### VOYAGE.

When choice is possible, the voyage should be timed so that the nurse may reach the end of her journey after the hot weather—in the end of September or in October. The nurse's object is to arrive at her destination in as good health and as fit for work as possible; and to attain this end she must exercise care, and possibly a little self-denial, in regulating her life on board ship. She will naturally be careful as to what she eats and drinks, and should try to take all the active exercise the opportunities afforded permit. Since the introduction of refrigerating chambers on board passenger steamers the task of providing fresh food of every kind has been greatly simplified; but even under these improved conditions perfect safety cannot always be guaranteed,



and on one or two occasions, towards the end of the voyage, travellers have noticed a peculiar tainting of certain articles of food preserved in this way, which suggested commencing decomposition; quite possibly the condition was developed under the influence of hot weather after the food had been removed from the refrigerator; but, however it was occasioned, and under whatever circumstances it arose, if suspected, it should at once warn the consumer to exercise increased care at table. An attack of diarrhœa, brought on by an indiscretion in diet, may yield readily enough to a dose of castor oil and a little enforced abstinence; but such an occurrence is to be regretted, and the sufferer, who is experiencing tropical weather for the first time, may find diarrhœa by no means such a simple matter as any previous experience she has had of the complaint in England might have led her to suppose. Special care should be taken by the nurse who goes on shore at any of the ports of call on the way, as the food supplied in some of the hotels she may visit is often of a doubtful character. Under such circumstances it is safer to drink bottled aërated water than plain water, and milk had better be avoided altogether. Fruit should always be eaten with care, for, though its effect as a cause of bowel disorders has been greatly exaggerated, real danger may attend its consumption if the necessary precautions have been neglected. Those who are familiar with Eastern bazaars know that the opened water-melons, in order to preserve their fresh appearance, are often sprinkled by the vendors with water of a distinctly dangerous kind; and much the same is true of many of the other fruits and vegetables exposed for sale. Apart from this practice, the attacks of flies, and the mere handling of the fruit by the dirty hands of the native salesman, may be sources of danger to the consumer. It is difficult to purify grapes by washing; and as in eating grapes the skins have to be sucked, they may be taken to represent a class of fruit at this time



better avoided altogether while travelling. The thick rinds of the mangosteen, pummelo, and pineapple effectually protect the part eaten from contamination; while in the case of plantains, mangoes, and the like, ordinary care taken in removing the skins will generally be a sufficient precaution.

As a simple traveller, if not in her professional capacity, the nurse will no doubt hear a good deal from her fellow-passengers regarding sea-sickness and its treatment. Some favoured individuals are able, it would seem, to master the disease by a determined effort made from the first; but the number who succeed under really trying circumstances is small, and in such people it is doubtful whether the malady would ever have made any serious inroad—the attempt is, however, certainly worth making. If vomiting is really severe, the sufferer had better give in and rest for a time in the horizontal position, confining herself to lemon-juice and water, with the addition of small quantities of beef-tea, assisted by a little dry toast or toasted biscuit. Routine treatment by alcohol, in the various forms so freely recommended by irresponsible advisers, should generally speaking be avoided; if a stimulant is really needed, good brandy diluted with sodawater is perhaps the best form to give it in. Champagne, though sometimes useful, induces in some cases an acid dyspepsia, which adds greatly to existing discomfort; and the same is true of porter, another popular remedy. Hot water is comforting to many, and is of decided use to some, when retching is painful and not followed by relief. When drugs are needed—and there are always a small number of cases in which they must be used—their administration had better be entrusted to the ship's doctor.

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#### CLIMATE.

Hot climates, the climates with which we are alone concerned, are conveniently classified as



tropical and sub-tropical. The limits of the tropical and sub-tropical zones have of course been long ago defined by geographers; but climates, which depend on so many conditions besides those of proximity or remoteness from the equator, can only be described as roughly corresponding with the areas on the earth's surface indicated by their designations. By a tropical climate we understand a climate in which a high atmospheric temperature is maintained, with comparatively little variation, throughout the year. In these climates for about four months, spoken of as the "hot season," the thermometer ranges from 85° to 100° F. and over, during the day; while during the night there is seldom a greater fall than from 5° to 10° below this. Tropical climates are further distinguished by the rainfall, which occurs at stated periods, and is practically limited to two or three months of the year, constituting what is known as the rainy season, or simply "the rains." In climates distinguished as sub-tropical, while several months may be cool and one or two even cold, there is during the hot season—the late spring, summer, and early autumn—such a decided and sustained rise in temperature as to make the conditions of life and the manifestations of disease at that time practically identical with those observed throughout the year in the tropics. The climates of Calcutta and Singapore are tropical, those of Cairo and Shanghai are sub-tropical.

#### EFFECT OF HEAT.

A certain number of the cases described as sun-stroke and heat apoplexy may quite possibly have exposure to great heat as the sole cause at work in their production; but, apart from these, a high temperature cannot be regarded as of itself sufficient to cause acute illness. A sustained high temperature, however, distinctly influences the course of many diseases; and its effect, which is almost



uniformly unfavourable in the case of Europeans, is exercised not only while the illness lasts, but also, and often to a marked degree, during the convalescence of the patient. When tropical heat is associated in the atmosphere with excessive moisture its effect is greatly intensified, the combination exercising a depressing influence on bodily functions difficult to realise unless actually experienced. Those who are already ill naturally suffer most, and in such weather patients under treatment all seem to lose ground, and the work of the nurse meets with little encouragement. It follows from this that the nurse, who has Europeans under her care, must give a good deal of time and attention to the various arrangements best calculated to lessen the injurious effect which excessive heat is sure to have on her patients. Among the means at her disposal for this purpose the punkah, as the most generally useful, first claims our attention.

#### PUNKAHS.

Punkahs are suspended from hooks driven into the ceiling of the room, or, in some private houses, from one of the cross-bars in the framework of a mosquito house, when a house of the kind takes the place of the ordinary mosquito net. In the East they are all pulled by native servants. Whatever material is used in making the body of the punkah, a certain proportion must always be maintained between size and weight. If the punkah is too light, the to-and-fro movement will be jerking and unequal; if too heavy, the coolie who pulls it will be taxed unnecessarily. When punkahs are used during the night, as is often the case in private houses, it is usual to provide two coolies, and the nurse will make what arrangements she can to prevent the service from being interrupted. In very hot weather, if a night punkah stops working, the patient is sure to perspire profusely, and the rapid evaporation which follows when the service is



resumed chills the surface of the body in a way better avoided. Nothing more surely disturbs sleep than an irregular punkah service during sleeping hours. Ordinary mosquito nets will need to be removed to make way for a night punkah; and when this is done, protection from mosquitoes must be got by lengthening the frill or flounce which forms the lower border of most punkahs, so as to bring the range of movement within a foot or two of the patient's face; if this is properly managed, and the punkah service is not an interrupted one, mosquitoes will be effectually driven away. The new arrangement may possibly be at first objected to by the patient, but tolerance is soon established. The sudden onset of serious symptoms is one of the features of disease in the tropics. Should it happen that a punkah is unexpectedly needed during the night where no previous provision has been made for its use in the room occupied by the patient, the bed in private houses may need to be removed, or another improvised in one of the sitting-rooms. In the dining-room, where a punkah is always to be found, a mattress laid on the table may do at a pinch; and if mosquitoes are troublesome, the nurse can easily lengthen the punkah frill with the aid of a bedroom towel and a few safety-pins. The clothing of a patient sleeping under a punkah needs special attention, and a thin India gauze singlet will in most cases be found the best covering for the body; a flannel cummerbund, or 'cholera belt,' is a good addition to this. Additional coverings are often needed in the early hours of the morning, and should be provided for by a thin blanket kept in readiness at the foot of the patient's bed. If desired, the loose pyjama shirt may now be put over the thin singlet covering the body. When heat is excessive the patient may be unable to tolerate any covering, and contact even with the sheet enveloping the mattress is objected to; under these circumstances a piece of the soft grass matting made in



many parts of India and China will provide a cool and comfortable resting-place in bed. Children, who often perspire profusely about the head and neck at night in hot weather, may with advantage have their pillows encased in this matting; but great care must be taken to select the proper quality; it must be soft and pliable, the commoner kinds making a very uncomfortable resting-place for the head. In hospital practice it is not always possible to make a sufficient use of punkahs; but the effort should always be made in warm weather to provide one during the hottest hours of the day, and when the principal meals are served in the wards.

When punkahs are not to be had, or the service cannot be sufficiently maintained, fans should be given to the patients. Palm-leaf fans are the best to use; they can be got almost everywhere throughout the East, and, as they cost a mere trifle, can be destroyed when they have served their purpose.

#### ICE.

As a result of improved methods of manufacture, and the increased facilities provided for distribution and storage, there are now few places in the East where European nurses are employed where ice cannot be obtained: the purity of the supply is another matter, and one which, unfortunately, can seldom be guaranteed. It is the nurse's duty to ascertain the character of the ice she uses; and if doubtfully pure it should, of course, neither be given to the patient to suck, nor be put in the liquids he drinks. The ice-chest is then its proper place, and, as ice-chests are used almost everywhere where ice can be got, the nurse should have no difficulty in at least securing the cooling of liquids, and the preservation of the food, she gives to her patients. When ice is of good quality it is sometimes ordered to be crushed, and in that state given to the patient, to be taken by him from time to time as he may feel inclined. In hot weather it is a little difficult to



arrange this so that the supply shall remain constant and within the patient's reach. To preserve the ice it should be kept as far as possible covered from the air, and removed from contact with the water it forms in melting. This can be conveniently secured by the use of one of the special cups made for the purpose ; or, when such a receptacle cannot be got, by putting the crushed ice in one of the basins provided on washing-stands to hold the sponge—a piece of flannel laid on the top completing the arrangement. When ice cannot be obtained, liquids may be cooled by immersing the vessels containing them in one of the wells so often found sunk in the compound surrounding a bungalow in the East. Unfortunately the water in nearly every well of the kind is of doubtful character, and, if recourse is ever had to this plan, care must be taken that no communication takes place between the liquid to be cooled and the water in the well. On this account the matter is one which can seldom be safely trusted entirely to a native servant. Rapid evaporation from a wetted cloth surrounding the containing vessel will do something towards reduction of temperature, and this plan was frequently taken advantage of on board ship in the old days, when the ice supply—a much more precarious matter then than now—ran short ; the bottles, covered as described, were hung up by the stewards in an open port on the windward side of the ship.

#### TAKING TEMPERATURES.

The duty of taking temperatures is one which in most private houses, and in many small hospitals, devolves chiefly on the nurse. There can be little doubt that the temperature of patients needs to be more carefully watched in a hot than in a cold climate ; for, besides the cases of sunstroke and heat-apoplexy which are more directly associated with the condition of the atmosphere, fevers of all kinds under the influence of great heat are apt to



run a somewhat irregular course ; while in the case of those due to malarial poisoning a sudden, and it may be dangerous, rise in body temperature is by no means an uncommon occurrence.

#### HYPERPYREXIA. HEAT APOPLEXY.

Heat apoplexy and thermic fever are names given to that form of hyperpyrexia which results from, or is at least constantly associated with, exposure to sustained tropical heat. It is the high temperature of the patient which, from the first, mainly distinguishes these cases from the more common forms of illness occasioned by exposure to a tropical sun, and usually described as cases of sunstroke. In heat apoplexy the patient, along with the high temperature, has the appearance of a man suffering from cerebral apoplexy ; he is more or less unconscious, he may be delirious, and is sometimes convulsed ; some are threatened with asphyxia from the beginning of the attack. In a large number of the cases of uncomplicated sunstroke there may be little at first evident save a syncopal condition ; the temperature is not raised, and consciousness is not seriously affected ; when pyrexia is developed, it is usually a comparatively late occurrence. In cases of heat apoplexy treatment must be prompt and energetic if life is to be saved. The treatment of sunstroke is usually a comparatively simple matter ; consisting in the first instance, and for the most part, in removal of the patient to a cool room from which light is excluded, the administration of a stimulant, and the application of cold water or ice to the head. Cases of heat apoplexy, unlike cases of sunstroke, are frequently developed during the night, and when seen during the day the patients are often found in the house and even in bed. Previous excess in alcohol is a common complication in heat apoplexy.

Hyperpyrexia, whether it occurs during the course of a specific fever, follows direct exposure to a



tropical sun, or results from no other apparent cause than sustained tropical heat, is a condition attended with immediate danger to life, and one in which active treatment cannot be delayed.

#### THE COLD BATH, &c.

In the treatment of heat-apoplexy the reduction of temperature by the use of cold water is chiefly of importance, and must now occupy our attention. The bathing or douching of the patient is generally done under the personal superintendence of the doctor in charge or his assistant; and in England the services of the nurse will seldom be called into requisition unless under some specific direction of the kind. In the East however the position is not at all an impossible one, and the nurse should be prepared to act in an emergency. The writer can recall more than one case in which, in the absence of a doctor, life was apparently sacrificed to delay in treatment. If, along with a high temperature ( $106^{\circ}$  Fahr.), there is delirium or any loss of consciousness, the case is urgent. As a general direction, the nurse may make the necessary preparation for the use of cold water when her patient's temperature has reached  $105^{\circ}$ , and at  $106^{\circ}$  treatment in one or other of the ways to be described presently may be begun. It is, of course, understood that temperatures are taken in the mouth only when the state of the patient admits of this being done quite satisfactorily; in heat apoplexy the rectum is usually the only place in which accurate observations can be made. When a bath is used, the water, between  $80^{\circ}$  and  $90^{\circ}$  to begin with, may need to be reduced considerably below this—to  $60^{\circ}$  or  $70^{\circ}$ ; and it is obvious that in hot climates to get water at these temperatures it will almost invariably be necessary to add ice. In the treatment of these cases of hyperpyrexia, the application of cold should be discontinued before the temperature has been greatly reduced. This should be done, and the patient



removed from the bath, when the thermometer registers  $102^{\circ}$  in the rectum, in cases in which the temperature has not previously been over  $106^{\circ}$ ; at  $104^{\circ}$  in the rectum in others in which higher temperatures than  $106^{\circ}$  have been reached.

Sudden heart failure is a risk always more or less present in heat apoplexy, and one which must be carefully guarded against. Stimulants are often needed, and there is nothing in the high temperature of the body to contraindicate their use; though of course caution must always be exercised in the case of patients believed to have been under the influence of alcohol at the time of their seizure. To patients who are unable to swallow, stimulants must be given by the bowel. If, as sometimes happens, death from failure of respiration is threatened, it is advised that recourse be had to artificial respiration, which should always have a full trial before the case is abandoned as hopeless. So far as the nurse is concerned, in the absence of a doctor, artificial respiration may certainly be tried when the condition of the patient's breathing suggests its employment; too much, however, must not be expected to result from its use. Indeed it would seem that when a tendency to asphyxia is manifested at the beginning of the illness, bleeding is the only measure likely to be of much service; when on the other hand the breathing suffers at a later stage, it is generally a symptom secondary to heart failure, and is usually the immediate precursor of death.

It is by no means an easy task to lift a patient in and out of a bath who is semi-conscious and unable to help himself, and the necessary assistance cannot always be obtained even in hospitals; this difficulty to some extent limits the use of the cold bath. In an emergency, as in the case of soldiers on the march or cases treated in the open air, douching with cold water can be conveniently carried out with the patient lying on an inclined stretcher, in the way practised and advised by Chandler. When practising



in Shanghai I had a couch made for use in the General Hospital there for the treatment of cases of hyperpyrexia, and can recommend it as a convenient and inexpensive appliance (*see illustration, frontispiece*). A couch on the same principle is described and figured by Professor Thomas of New York in his book on diseases of women. If the couch is made entirely of bamboo, as mine was, it is easily carried about from one ward or verandah to another by a single attendant. The bamboo settees so largely used by the natives of China to sit and sleep on in the open air are easily converted to this use; for, beyond the removal of the cross-bar at the lower end, to make way for a bucket put there to catch the water as it runs away, very little is needed in the way of further adaptation. The top, or seat, of these couches is made of open bamboo work, through the meshes of which the water poured over the patient escapes readily. To catch and to conduct this water to the bucket a receiver, shaped like a trough and made of some waterproof material such as American oilcloth, is needed; this is fastened below the seat by tapes tied along the sides of the couch, and should slope towards the lower, the bucket, end. The patient under treatment is stripped and covered with a sheet; his position on the couch making it an easy matter for the attendants to take temperatures, to give stimulants, or to make any direct application of ice, &c., which may be thought necessary. If the case is a troublesome one the bucket may need to be emptied and replaced many times; but in the East, where labour of the kind is so easily obtained, such a detail is immaterial. When there is no ice, and the temperature of the water cannot be sufficiently reduced, a punkah may be used to hasten evaporation from the wet sheet.

When a suitable bath and the necessary assistance cannot be got recourse must be had to cold sponging, and the application of cloths wrung out of cold water. This last plan is usually the first to be tried in the



hyperpyrexia of young children; the effect is in nearly every case sufficient, and is easily regulated by the temperature of the water, and the more or less frequent changing of the wetted cloths.

### MOSQUITO NETS AND MOSQUITO HOUSES.

In what was said about the punkah reference was made to mosquito nets, but these useful appliances cannot be dismissed with casual mention only. Protection against mosquitoes is one of the most important of the special arrangements made in connection with the patient's bed in hot climates, and as such is a matter which directly concerns the nurse. The bite of a mosquito is rarely followed by any more serious immediate consequences than that of a limited area of surface inflammation attended by itching of a more or less annoying kind; but the effect varies with varying local conditions, and a good deal depends on the situation of the bite and individual susceptibility to the poison. Tolerance is in most cases to a great extent established after a few years' exposure; indeed, the bite on the skin of an old resident shows often as little more than a red speck, while itching may be altogether absent. If the local effect were all that had to be considered the use of the mosquito net, however desirable, could scarcely be described as one of the most important details in the arrangement of the patient's bed. At the present date, however, when the mosquito has been clearly shown to be the principal, if not the sole, agent in the dissemination of the blood parasite on which malarial fever in man depends, our attitude as regards protection against the attacks of the insect has altogether changed, and what was at one time regarded as expedient only has now become a duty which ought never to be neglected or imperfectly discharged. The fact that it is only mosquitoes of a certain kind, and on the whole of limited



distribution, which are to be dreaded in this way scarcely affects the question, as in any particular case the entire absence of these would need to be demonstrated before protection could be safely spoken of as unimportant so far as malaria is concerned. Apart from their connection with malaria, mosquitoes are undoubtedly a source of considerable annoyance to all who are exposed to their attacks ; indeed, in really hot nights abroad, when sleep comes with difficulty to everyone, the humming noise which these insects make is often alone sufficient to disturb the repose of a man in perfect health. For this reason, if for no other, the nurse must pay particular attention to the arrangements made for the protection of the patient's bed.

Mosquito nets, which have usually a border of thin cotton cloth, are either secured by being tucked in under the mattress, or they surround the bed, the lower border resting on the floor ; in the last case the border is weighted so that the position of the net remains fixed. During the day the net is raised, and the bulk gathered up conveniently on one side or on the top of the bed. Before the net is lowered and secured for the night, the attendant should make sure that no mosquitoes are concealed in its folds or in the space which it encloses, including the space under the bed when a weighted net resting on the floor is used. The material of which mosquito nets are made is very easily torn, and it is astonishing through what a small hole a mosquito determined to effect an entrance will find its way. It is the nurse's duty to see that the curtain which protects her patient is not in any way damaged. The mosquito house is simply a framework of wood over which mosquito netting is stretched ; it is entered by a door at the side, and is usually provided with a punkah which hangs from one of the cross bars in the roof, and is pulled through a hole in the framework. Other modifications—such as that in which a wooden frame, with uprights only at the corners,



supports a net weighted along its lower border—need no special description ; details may vary a little but the principle is the same in all. As time goes on it seems not unlikely that wire gauze windows and doors will largely take the place of mosquito nets.

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Enough has been said regarding the general principles which govern nursing in hot climates, and sufficient details have been given regarding their application by the nurse. Attention must now be directed to a few of the principal diseases for which the nurse's services will be required, and to any duties connected with these which seem at all unusual or peculiar.

#### BOWEL DISORDERS.

One of the first things likely to strike the nurse who is new to the East, is the large proportion which bowel disorders bear to other medical cases. That heat is an important factor in the production of these cannot be doubted, though it might be sometimes difficult to say in what way exactly it had acted in individual cases. The mucous membrane lining the alimentary canal may suffer in hot climates in sympathy with the skin with which it is continuous ; the general enfeeblement which tropical heat produces in Europeans is by no means confined to the muscular and nervous systems, but through these seriously affects the functional activity of the digestive organs ; heat causes rapid decomposition, making ordinary food unwholesome ; heat favours the rapid growth of specific germs such as those on which cholera and the epidemic forms of diarrhoea and dysentery depend. Explain the matter how we may, the fact remains, and is abundantly proved by the records of our own registrars in England, as well as by the medical history of communities in the subtropics, where the diseases which accompany periodic

and decided variations in temperature can perhaps best be studied.

In all cases where the bowel secretion is affected, special attention must be given to the motions, their frequency, character, and the immediate effect they may have on the patient. As the nurse is more or less constantly in the ward or sick-room much of this duty will rest on her, and in the case of female patients she will be chiefly responsible. In recording the number of the motions distinction should be made between those passed during the day and those passed during the night. A patient will go to stool during the day as the result of slight disturbance which would have little effect at night; and, on this account, motions passed during the hours usually devoted to sleep may be taken to indicate a more serious form of the disease under treatment. Should the nurse be asked to describe the motions she should do so systematically, having regard to odour, quantity, consistence, colour, and especially to the presence of any extraneous matters as blood, mucus, pus, or worms. The colourless rice-water stool of cholera, and the scanty motion containing blood and mucus seen in dysentery, are easily recognised; the great exhaustion ending in collapse which follows the first, and the pain and straining which accompany the second, further distinguish the cases. During the first few hours, occasionally during the first few days, there may be nothing to distinguish a case of cholera or dysentery from one of simple diarrhoea; the nurse should bear this in mind, although her services will seldom be required before a definite opinion as to the exact nature of the illness has been expressed by the physician in attendance.

In cases of bowel disorder of any severity the use of a bed-pan is necessary; in most cases of dysentery it should be insisted on by the nurse. If the bed-pan is refused by the patient, as it often is in the beginning of an illness, a suitable receptacle must be



placed at the bedside. Nothing can be worse in cases of diarrhœa or dysentery than visits paid to a cold or exposed lavatory during the night.

Bowel washing is often ordered, either as a preliminary step to the administration of an opiate or nitrate of silver enema, or simply as a routine treatment when it is thought necessary to remove irritating secretions from the lower bowel. Plain water at a temperature of 100° Fahr., or better still, water which has had its specific gravity raised by the addition of 0·6 per cent. of common salt, roughly speaking a teaspoonful to the pint, should generally be used for these washings ; but occasionally boracic acid or some other suitable antiseptic, an astringent, or bicarbonate of soda, is ordered to be added to the water. The giving of these enemata is an operation frequently entrusted to the nurse. An irrigator is the proper instrument to use in washing the bowel, the object being the production of a gentle, continuous and easily regulated flow, for which the enema syringes in common use do not sufficiently provide. The irrigator should be fitted with about five feet of indiarubber tubing ending in a nozzle suited to the case under treatment ; the common bone nozzle, two inches long, will be sufficient in ordinary cases, but in some gum elastic is a better material to use than bone, and the length of the mount may be increased with advantage. The introduction, or at least the control, of the nozzle can often be left to the patient, while the nurse stops the escape of the water by using the stopcock, or simply by pinching the india-rubber tube between her fingers ; if this is done after a little water has first been allowed to escape, both nozzle and tube remain full, and the trifling inconvenience of introducing air into the bowel is avoided. As the force employed depends on the height of the reservoir, care must be taken in raising this to avoid undue or sudden increase of pressure ; two or three feet above the bed will be found a sufficient elevation in most cases, and the lowest level which allows of



a slow continuous flow is the one generally to be preferred. The quantity of water used must be regulated according to the special requirements of the case, and the sensations of the patient will usually need to be consulted, though not altogether trusted to, in determining this. Under ordinary circumstances two pints can be introduced without causing much inconvenience; if the washing is merely the preliminary to the administration of an opiate, a single pint will generally be enough.

In the case of an adult a common prescription for an opiate enema is thirty or forty drops of laudanum in one or two ounces of thin, warm starch; but this, of course, must not be given until after all the water used in washing has been got rid of. The small bulk of a starch and opium enema necessitates the use of a small syringe for its introduction. Glass syringes are very often imperfect, the slightest resistance at the point causing the ill-fitting piston to traverse the fluid and leave it behind in the body of the syringe. The nurse should always carefully test the efficiency of a small syringe before using it. Vulcanite syringes are generally well made, but have the disadvantage of not allowing the nurse to see at once when they are not being completely emptied. A small indiarubber ball is, perhaps, the best instrument to use, care being taken fully to express the contents.

When nitrate of silver enemata are ordered, and they are frequently prescribed in cases of chronic dysentery, the nurse will be guided in their administration by the instructions she receives from the doctor in charge of the case. Exact details vary somewhat in different hands, but bowel washing is always a preliminary step, done either with plain warm water or with water holding bicarbonate of soda in solution. In giving these enemata the staining properties of the solution should be remembered in connection with bed coverings and sleeping clothes, and provided against by the nurse.



Hot fomentations and wet packs are frequently used in the treatment of bowel cases, but it may be safely assumed that the trained nurse has nothing new to learn regarding the value of these or the details of their application, which for all practical purposes are the same in hot climates as in England. If nothing more than warmth and support is wanted, a single or double fold of cotton wadding, laid over the abdomen under a broad bandage or cummerbund, will do all that is required. For the application of dry heat Manson recommends the use of the flat tin boxes made in Japan, in which charcoal cartridges are burned; the boxes should be encased in flannel.

#### TEMPERATURE IN BOWEL CASES.

I have already spoken of temperature taking as one of the nurse's duties, needing on the whole closer attention in hot than in temperate climates. In many cases of bowel disorder the thermometer gives important indications as to the nature, progress, and possible complications of the disease. Thus, a sudden rise in temperature in acute diarrhœa or dysentery may show the bowel affection to be really due to the poison of malaria; while in a chronic case, a recurring rise of temperature in the afternoon or evening may be for weeks the only symptom pointing to the formation of a centrally placed liver abscess. In cholera the thermometer is only of real service after reaction has set in. In acute dysentery, not connected with malaria or complicated with liver abscess, its indications are not of much value; with regard to these cases it should be noted, that in some of the worst the temperature of the patient may be little above normal throughout the illness. Taken along with other symptoms, such as restlessness, delirium, and a failing pulse, a subnormal temperature in dysentery indicates destructive ulceration of the bowel and a fatal termination.



## FEEDING IN BOWEL CASES—MILK.

In all bowel cases the feeding of the patient is one of the most important of the details involved in treatment, and this is a matter in which the nurse is largely concerned. In the acute stage of diarrhoea and dysentery milk is often the only food allowed; while in chronic cases, a diet consisting of milk alone is usually given a full trial before recourse is had to other forms of nourishment. In using milk the purity of the supply is the first point which should receive attention. Wherever natives are concerned in the collection and distribution of milk, and the cases are few in hot climates in which they are not more or less employed in this way, purity is endangered, and, speaking generally of dairies throughout the East, can seldom be absolutely depended on. Milk should as a rule be boiled before it is given to the patients. After boiling the milk should be poured into bottles and stored in the ice chest; it is unnecessary to add that the bottles used for the purpose must be kept scrupulously clean. Buffalo milk is seldom used by Europeans; it is richer than cow's milk, and has a less agreeable flavour. Milk is usually taken readily by the patient, but in a few cases it is objected to from the first, and in some, even when taken easily, it is not digested. When milk is not digested curds appear in the motions, and the presence of these should always be looked for in cases where milk is given largely. The following is nearly a complete list of the various plans proposed to improve the digestibility of milk and secure the assimilation of a sufficient quantity:—Dilution with plain water, rice and barley water, efferverscing and alkaline waters; the addition of alkalies, and, or, common salt; aeration; concentration by evaporation; predigestion by peptonising. The aeration of milk is done by means of a machine called a seltzogene, but at the present date the same effect may be produced, and possibly



more conveniently, by the use of "sparklets." In condensation by evaporation, recommended by Thin in special cases, the milk is put in an enamelled saucepan which fits into another pan containing water, and the heating is conveniently done over a spirit lamp; the milk is never allowed to boil, and is constantly stirred to prevent a skin forming on the surface and hindering evaporation; a reduction to half the bulk may be ordered, and this will take between one and two hours to accomplish.

When milk is the sole nourishment given, quantity is a matter of considerable importance; this is however of course a matter to be regulated by the doctor; it is enough for the nurse to know that from three to six imperial pints of undiluted cow's milk in twenty-four hours, in the case of an adult, covers the ground between what is commonly regarded as a small and a large quantity. Milk is usually given in amounts of from five to ten ounces at a time. With a view to improve its digestibility by ensuring slow consumption, it has been recommended in some cases to give it sucked through a glass tube or from an infant's feeding bottle. The addition of a little coffee or lightly-infused tea to the first cup of (warm) milk taken in the morning is often highly appreciated by the patients; and this, along with a slice of well-toasted or torrified bread, gives at least the semblance of a breakfast, and breaks the monotony of the restricted diet.

Besides milk the only other foods which call for special notice here in connection with bowel cases are beef juice and beef mince. Either of these is frequently ordered, and it may be, as in the case of milk, to the exclusion of any other form of nourishment.

#### BEEF JUICE AND BEEF MINCE.

The preparation of beef juice and beef mince is a matter which the nurse should thoroughly understand.



To force the juice from meat in sufficient quantity a special press is needed, and this, along with a mincer for the preparation of the mince, should be part of the plant in all hospitals where cases of the kind under consideration are received. The juice of raw meat is occasionally prescribed, but is generally disliked by the patients; theoretically it may be more nutritious and possibly more easily digested, but in practice will be found little superior to the juice expressed from underdone steak. A pound of underdone steak freed from fat and skin, when cut up and put in the press should yield a small coffee-cupful of juice, and this is about the quantity needed at each meal—given about every two hours during the day. Along with beef juice a thin slice of well-toasted bread is usually allowed. The stools of patients undergoing treatment by beef juice are dark brown in colour, and of course scanty.

The directions given for the preparation of beef mince in Mrs. Elma Stuart's book describing the so-called "Salisbury Cure" can scarcely be improved on; in carrying these out the personal superintendence of the nurse will at first be required. The mincer recommended is the one known as the "Enterprise." The beef is either used raw, or browned quickly on both sides in a frying pan over a clear fire; meat intended to be cooked before it is minced should be cut in slices about an inch thick. The cooked or raw meat, freed from fat and skin, is cut in strips and passed through the mincer from three to five times. It is then beaten up with water in an enamelled saucepan, with a wooden spoon, until reduced to a smooth paste; water should be in the proportion of a teaspoonful to an ounce of meat; a little more warm water may be added if the mince in cooking becomes too dry. The cooking is done at a gentle heat on the side of the range, stirring all the time and raising the mince from the bottom of the pan, which should never be allowed to become so



hot that it cannot be touched with the finger. If the mince smokes the pan must be at once raised. Raw meat takes about half-an-hour to cook in this way, the meat from the frying-pan five or six minutes only. The mince when ready should resemble smooth putty, and should never present that hard granular condition so often seen in minces made from fresh meat cooked in the ordinary way. Beef mince should be served in a hot bowl and eaten with a teaspoon. Pepper and salt are the condiments recommended and a thin slice of toast, or toasted biscuit, is usually allowed with each meal.

It is not by any means easy in hot weather to keep the presses and mincers used in the preparation of beef juice and beef mince clean, but this is a matter which must always be strictly attended to. They should be taken to pieces as far as possible after use, and boiled in water to which carbonate of soda has been added.

Among cases of chronic diarrhoea there are always a few, distinguished as cases of sprue or psilosis, in which, owing to the state of the mouth, food of almost every kind is taken with difficulty. In these cases the mucous membrane lining the mouth and covering the tongue suffers from a more or less extensive loss of its protecting epithelium, and this is associated from time to time with the appearance of aphthous-looking spots and the formation of superficial ulcers. In a well-marked case a condition may in the end be established in which mere contact with food causes suffering, and all the movements connected with swallowing and mastication are difficult and painful. In feeding such patients the nurse will have to exercise a good deal of both patience and perseverance, for it is essential that a sufficiency of nourishment be taken, however it is administered. Milk, a bland fluid which has the advantage over all other forms of nourishment in containing without any addition all that is absolutely needed for the support of the body, will



usually be found the best food to use, and it certainly gives the least trouble to the patient. Concentration by evaporation has one of its best applications in cases of the kind, where it is desirable to shorten the period of administration and at the same time secure that a sufficient quantity is taken. Milk should be given lukewarm; extreme degrees of either heat or cold are always objected to by patients suffering from sprue. When beef juice or beef mince is ordered condiments will have to be avoided as far as possible. Jellies, as milk and calves' feet jellies, are easily swallowed, and the nurse, under the direction of the doctor, may have an opportunity given her for the exercise of her ingenuity in the preparation of these so that they may be at the same time nutritious and palatable.

In uncomplicated cases of sprue death results from inanition, and the importance of small details in the feeding of these patients can scarcely be exaggerated.

#### MEDICINE, &c.

In the treatment of bowel affections by medicine given by the mouth, the only drug which calls for special notice, so far as the nurse is concerned, is Ipecacuanha as prescribed in dysentery. Ipecacuanha is usually given in powder, and in a single dose of from twenty to thirty grains, conveniently swallowed in cachets. Ipecacuanha should be given when the stomach is empty, and the patient be kept quiet and in the horizontal position for some hours after its administration. To prevent vomiting a sinapism is sometimes applied to the epigastrium, and the dose is guarded by opium, fifteen or twenty drops of the tincture, given about half an hour before the powder. Even when all precautions are taken, vomiting is often sudden and uncontrollable, and the nurse should make what preparations she thinks necessary to meet this, but should do so unobtrusively, to avoid as far as possible suggesting its occurrence to the patient.



In bowel cases long under treatment the patients should be frequently weighed, and a record kept of the results. When this is entrusted to the nurse she should be careful to see that the weights are taken at the same hour of the day—preferably before breakfast—and that due allowance is made for any change in the clothing of the patient.

### FEVERS.

Much has been written on the varieties of fever seen in the tropics, but in this the nurse is only indirectly concerned. Her duties are little affected by varieties in type; and the nurse who is qualified to undertake the case of enteric fever in England has very little to learn regarding the management of similar cases abroad, however widely these may differ in the points which distinguish them as belonging to a particular class, or as due to a special cause.

The really important points in regard to which the duties of the nurse in charge of fever cases in a hot climate appear to be at all unusual or peculiar, have been already discussed in what was said regarding the taking of temperatures, hyperpyrexia, the use of punkahs and mosquito nets, ice, and the cold bath, and but little remains to add to this now. In the treatment of fevers in the East, however, quinine is a drug so frequently prescribed that a few lines may be usefully devoted to the subject of its administration. In malarial fever the large dose ordered is generally directed to be given in the sweating stage, when the temperature has fallen. When it is possible to choose the time of administration it is better to give these large doses at night before the patient goes to sleep, and in this way to lessen the discomfort of the cinchonism they may occasion; if given in the morning it should be after breakfast, when the stomach contains food. It is often difficult to get children to swallow a sufficient dose of quinine; on

the whole the drug is best given to children in sweetened milk ; and if the child can be induced to eat a piece of well-buttered bread—not a difficult matter if sugar is added to the butter—before taking the medicine, the bitter taste and its persistence will certainly be lessened. The administration of a large dose of quinine to a woman who is pregnant is regarded by many as attended with risk, and it is the practice of some physicians when obliged to prescribe this, to guard the dose with chlorodyne or some preparation of opium. Quinine may be given by the bowel in a suppository or enema, and by the skin as a subcutaneous injection ; but the best method of administration in any particular case is of course a matter for the doctor to decide. Tabloids of quinine are convenient, but are apt to harden if kept for any length of time ; when this is the case they should be crushed before being taken.

Convalescence after fever of any severity is a tedious process among Europeans in the tropics. The muscular and nervous systems slowly regain tone, gastric catarrh lingers, the lost appetite is restored with difficulty, and the skin acts excessively especially at night. The treatment of these cases taxes the resources of the doctor and the patience and perseverance of the nurse. In the end all efforts may fail and a complete change of climate be found the only remedy. Fresh fruit is a welcome and valuable addition to the diet of convalescents from fever : in giving this to her patients the nurse should remember the precautions advised in her own case in what was written on the subject of her voyage and life on board ship.

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#### SURGICAL CASES.

For want of the necessary appliances and assistance there are few, if any, hospitals in the East in which aseptic surgery can be safely practised ; and



the nurse who goes abroad, and may at any time have surgical cases under her care, should, along with practical knowledge of the methods by which dressings, &c., are efficiently sterilised by heat, be also familiar with the antiseptics in common use—their preparation, dilutions, and various applications. Such knowledge should be acquired in a good hospital before she leaves England.

The duties of a nurse who is in charge of surgical cases abroad do not differ in any important particular from those of a nurse who is similarly employed at home. In very hot weather, when the patient is perspiring profusely, antiseptic dressings may need to be more frequently changed; but this is a matter which only indirectly concerns the nurse. Any appearance of discharge on the surface of a dressing, as from a recently-opened liver abscess, must have immediate attention. When detected by the nurse she should, unless otherwise instructed, at once apply additional protection in the shape of a pad of gauze wrung out of carbolic lotion, laid on the outside of the dressing, and retained in position until the surgeon or his assistant is able to see the case. Inflammatory affections of the liver ending in suppuration are of frequent occurrence in hot climates, in connection with the bowel lesions caused by dysentery and the more serious forms of diarrhoea. When an abscess is deeply placed in the liver substance pain is rarely severe, and may be altogether absent; when, on the other hand, the abscess is superficially placed, or is approaching the surface, pain becomes a leading symptom and is usually acute and stitch-like in character. Should a hot fomentation be ordered in a case of the kind, the nurse must be careful in applying it to avoid any injury to the skin. The opening of a liver abscess on the surface of the body is an operation which must be done under strict antiseptic precautions, and a suppurating surface, resulting from a superficial burn or an injudicious application of



iodine, might delay or endanger the necessary surgical interference.

If the nurse is at any time put in charge of the instruments, she may be warned that in hot climates, when, as often happens, there is much moisture in the air, steel instruments are sure to suffer if not carefully looked after, and a single day's neglect may seriously injure needles and the edges of knives and scissors. At such times it is better, after washing and carefully drying the instrument, to smear it over with paraffin ointment—an ointment in which soft and hard paraffin are combined in proportions easily altered to suit the temperature. Vaseline (soft paraffin) has too low a melting point, and in really hot weather is apt to run together and leave spaces exposed on the surface of the instrument. Paraffin ointment keeps well under all circumstances and needs no antiseptic addition; boracic acid in an ointment injures steel if left long in contact with it. If the smearing is done carefully with a suitable ointment, the instrument will go through a whole wet season without sustaining any damage; and this is an important matter in the case of instruments only used on rare occasions, and as regards knives in situations where the services of a cutler cannot easily be obtained. Boiling in water to which a little carbonate of soda is added effectually removes the paraffin. The finer instruments, the cataract knives and scissors, used in eye operations, will need more careful treatment, but these the surgeon is scarcely likely to trust in any other hands than his own.

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#### OBSTETRICS.

Success in the management of obstetrical cases, so far as the nurse is concerned, depends on her ability to maintain the greatest degree of surgical cleanliness which the nature of these cases permits, the difference between a hot and a temperate climate



in no way materially affecting the details of the work to be done. In view, however, of the fact that a high atmospheric temperature favours early decomposition, it is advisable that the nurse practising in the East should give a little extra attention to the washing of the patient, and the changing of the pads used to absorb discharges.

In hot weather the labour may with advantage be conducted under a punkah pulled from the outside, usually from a verandah on the ground-floor. When possible an entirely fresh bed should be provided for the patient when labour is completed; this arrangement has many advantages, and the patient, who has probably been perspiring profusely for several hours, will welcome her complete and easily effected removal from wet and soiled surroundings. In midwifery cases the less use there is made of bed-pans the better; in all natural cases the bladder and bowel, if ordinary care be taken, can be safely emptied in the sitting position on a suitable receptacle placed at the bedside.

In ordinary cases when the necessary care has been bestowed by the physician in the use of antiseptics during labour, the cleansing of the external parts should be sufficient; and a solution of carbolic acid, the 5 per cent. solution diluted with an equal quantity of warm water, is perhaps as good a lotion as any to employ for the purpose. When antiseptic washings have to be extended to the vagina or uterine cavity the use of carbolic acid is not free from danger, and another antiseptic, such as chinosol, should be substituted; a suitable chinosol solution is easily prepared from the tablets supplied by the chemist. Perchloride of mercury, which, among other things, is a convenient antiseptic for the purification of the accoucheur's hands, is another antiseptic which cannot be safely used as a wash for the vagina or uterus. Absorbent cotton impregnated with salicylic acid is one of the best materials to use for the pads applied to the vulva to absorb discharges; it is



perhaps unnecessary to point out that the packet used should be freshly opened, and that the cotton should at all times afterwards be kept carefully protected from the dust of the room. The pads sold under the name of "antiseptic" can seldom be depended on abroad, though possibly to be trusted in England where they are manufactured. The removal of a soiled pad and the application of a fresh one should be taken advantage of by the nurse for the use of the antiseptic wash. The actual washing is best done with pieces of the salicylic cotton, which must obviously never be dipped twice in the basin containing the lotion. The nurse who is interested in her cases is scarcely likely to allow any of this work, on the efficiency of which so much depends, to be done by other hands than her own. When, as usually happens, a native female, an ayah or amah, is also in attendance, this woman should on no account be allowed to take any share in these washings; she is of course ignorant of the importance of small details, and cannot be trusted to do the work either thoroughly or safely.

Ladies often express a preference for native attendants to whose services they have long been accustomed, and this is only natural; but, unless in the case of native women who have undergone a special training, the doctor who knows the value of after-treatment in midwifery will always use his influence to secure the services of a European nurse for his patients. The nurse should use the ayah to assist her in changing the bed-coverings and sleeping clothes of the patient, and in such work as the serving of food and the arrangement of toilet necessities. Native women, as a rule, handle infants skilfully, and are able to give the nurse a good deal of help in looking after the baby.

#### INFANT FEEDING.

There are comparatively few European mothers who are able to nurse their infants satisfactorily in



hot climates ; and artificial feeding is a matter which can rarely be carried out, or even used to supplement the mother's milk, without more or less danger. Even when the purity of milk can be guaranteed, or insured by boiling, the danger of early decomposition is one always present ; and, as the food must be given during the night as well as during the day, supervision must be constant, and is difficult to maintain. The services of a native wet-nurse are in most cases sooner or later called into requisition.

Infantile cholera is the acute illness chiefly to be dreaded in the East in the case of the European infant who is nourished solely, or partially, on artificial food. The disease—a gastro-intestinal catarrh—often closely resembles Asiatic cholera in the adult. The symptoms are vomiting, watery discharges from the bowel, and a raised temperature ; accompanied by varying degrees of collapse, of which the depressed fontanelle, pinched features, feeble cry, and cold extremities, are the expression. Treatment in a case of the kind will of course be directed by the doctor in charge ; but the nurse should clearly understand that the first and most important detail in this, is the immediate withdrawal of the milk or other food in use, and its temporary substitution by egg albumen or meat juice. Thirst is always more or less present, and as the young infant may easily fail to make this apparent, the nurse must give her attention at regular intervals to its relief by the administration of warm water in sufficient quantity. Stimulants are usually needed to obviate the tendency to collapse ; of these good brandy is the best, and the most easily regulated. Brandy must of course be sufficiently diluted with water, or with egg-water, to which a few grains of salt may be usefully added.

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#### PROPHYLAXIS.

It is certainly one of the nurse's duties to guard, as far as lies in her power, against the spread of



disease from the sick to the healthy. Even when full instructions regarding the proper measures to be taken in any particular case are given by the doctor, success will ultimately depend on the careful and intelligent manner in which these are carried out by the nurse and her assistants.

The nurse must have some clear views regarding the probable channels through which the contagia of the new diseases she is brought in contact with enter the body, before she can hope intelligently to carry out precautionary measures to guard against their invasion.

In cholera and the epidemic forms of dysentery and diarrhoea, from the mere fact that the early symptoms of these diseases are from the first manifested in connection with the organs concerned in the digestion and assimilation of food, while the principal lesions seen in the body after death are found in the intestines, it is reasonable to suppose that infection is due to a contagium which has entered by the mouth as a swallowed poison. Nearly the same may be said of enteric fever, a disease with which the nurse's previous training in England has already made her more or less familiar. Moreover, the micro-organisms on which cholera and typhoid depend have been isolated, and positive proof obtained by experiments on the lower animals that these diseases can be introduced through the alimentary canal.

The poison of plague is believed to enter the body through the skin as well as through the mucous membrane. In the skin a breach of surface is probably always needed for its introduction. In bubonic cases, the position of the glands first affected has been thought to indicate the probable situation of the primary lesion: thus, when the groin glands are the first to suffer, the lower extremity is suspected; when the cervical glands take precedence, the disease is supposed to have entered by the tonsil. The specific organism which is the cause of plague



has been isolated, and experimental proof given that in the lower animals, besides inoculation, the virus can be introduced in food, and may also be conveyed through the nostrils without any apparent loss of continuity in the lining of these cavities. The specific bacillus of plague is widely disseminated in the bodies of the patients, making the disease a highly contagious one in many ways; the blood contains it, it is found in the contents of buboes, occurs in the urine and the fæces, and exists largely in the sputum of pneumonic cases. The bacillus has not yet been found in the air surrounding the patients, but this cannot be regarded as excluding the air passages as possible channels for its introduction; the occurrence of cases in which pneumonia is from the first the main feature of the disease, favours the view that the poison of plague is one which may sometimes be inhaled.

As already pointed out, the blood parasite which is the cause of malarial fever in man is conveyed by the mosquito, and, so far as our present knowledge goes, this is the only way in which that disease is transmitted.

In cases in which infection is probably the result of a swallowed poison, the attention of the nurse will naturally be first directed to the possible contamination of the food she uses and gives to her patients; and along with this, personal cleanliness, especially the washing of soiled hands, will suggest itself as of scarcely less importance. Should infection by the air passages be the danger which threatens, the nurse will give special attention to the ventilation of wards and sick-rooms, avoid prolonged exposure as far as she is able, and make use of an antiseptic mouth-wash or gargle. When the virus is one which can be inoculated, surface wounds, especially those situated on the hands, must receive immediate attention. When possible channels are many, the precautions taken must be multiplied in proportion.



## CONTAMINATION OF FOOD AND DRINK, &amp;c.

This is the danger chiefly to be apprehended in cholera, which may be taken to represent that class of diseases in which infection is believed to enter the body by the alimentary canal as a swallowed poison. When night soil is removed by hand labour, as it is everywhere in China, and, with the exception of a few large towns, nearly everywhere in India, the danger of direct contamination may be increased. The night soil removed in this way is of necessity temporarily stored in the compound or basement of the hospital or dwelling-house in which it has accumulated, to await its final removal from the neighbourhood in carts or buckets; and, when flies are numerous, it is evident that a dangerous communication may at this time be easily established between the receptacles which contain it and any articles of food or drink left unprotected by a suitable covering. At all times when the stools of patients are known or suspected to contain the contagium of disease, they should be disinfected in the lavatories before removal—at once if possible, or immediately after inspection when inspection is thought necessary. The urine in typhoid and plague should be similarly treated. The matron in a hospital in the East which is not in communication with sewers by a system of water-closets should ascertain from time to time that the night soil is being satisfactorily removed; and the nurse in charge of a case of cholera or typhoid in a private house would do well, under similar circumstances, to give the matter some attention. Native servants need a good deal of supervision in their work, and are especially apt to be careless in matters of the kind under discussion where the importance of small details is not clearly apparent. Disinfectants should be liberally used, and the kitchen kept well supplied with meat safes and covers for the protection of the food there. The native cooks should be instructed



as to the importance of keeping food and drink constantly covered.

Water, if at all of doubtful character, should be boiled before being drunk. When water is supplied in a house, a Berkefeldt filter attached to the service pipe is a safeguard and a great convenience. Pressure filters on the Pasteur principle are the only ones which can be really trusted.

The adulteration of milk is seldom practised by the native dealers in any other way than by the addition of water, but the water used may be, and often is, of very doubtful purity. In the case of milk, besides the possibility of deliberate adulteration, the quality of the water used to wash the utensils employed in collection and distribution, and the cleanness of the hands, and even the clothing, of the milkers are important considerations; being moreover details not at all likely to receive much attention from the native dairymen. The milk supplied by a native dairy should be boiled as soon as possible after it is received.

Uncooked salads should, as a rule, be avoided in the East. When such a disease as cholera is epidemic, salad materials bought in the market become positively dangerous. Vegetables should all be washed under the tap before they are cut up on the kitchen tables. The precautions to be taken regarding fruit have been already detailed.

#### PERSONAL.

The nurse should always use running water to wash her hands when running water can be got. If the supply is from a main or cistern she will have no difficulty in doing this, provided the tap is placed, as it should be, at some little distance above the basin it supplies. To wash the hands in a basin in the usual way is to keep them more or less in contact with the dirt which it is the object of the washing to remove, and if the dirt is of a dangerous kind such washing may be insufficient. When the



hands have been soiled in attendance on a case of cholera or the like, the nurse should wash them with turpentine before she uses soap, and may then as a further precaution immerse them in some antiseptic solution. The nurse must of course never eat before her hands have been thoroughly washed, and all soiled garments should be got rid of before she sits down to table.

Wounds on the nurse's hands, however trifling, should always receive attention, and must, of course, never be neglected for a moment when she is in charge of cases such as plague, where the contagium is one which can be inoculated. A convenient and reliable covering for small surface wounds is a dressing made with friar's balsam and collodion strengthened by a little cotton. A few threads of cotton wool, preferably absorbent cotton, are laid on the cut or abrasion, and friar's balsam is painted over these with a camel's-hair brush, care being taken not to displace the cotton. After a few minutes, when the balsam has dried, collodion is brushed over the whole. If this dressing is properly applied it may be safely trusted, and the hands may with ordinary care be washed without fear of detaching it. The dressing will last for several days, but in case of accidents fresh collodion had better be brushed over it from time to time.

Mention has been made of an antiseptic mouth-wash or gargle, as a prophylactic to be used by the attendants in cases in which infection is believed to enter by the mouth or air passages. The mouth-wash used, and apparently with good effect, by the men engaged in cleaning the Chinese quarters in Hong-Kong in 1894 when plague visited that colony, was one in which carbolic acid, spirit of camphor, and Eau de Cologne were combined. Boracic acid is sometimes employed as a mouth-wash, and a saturated solution—the proper strength to use—is easily and quickly prepared by adding the crystals to water at the temperature of the air, in such



quantity that after shaking the containing vessel and allowing it to settle, a distinct sediment, the excess of the salt, is seen to be deposited: this has the merits of safety and convenience, but unfortunately such a solution can only be regarded as possessing mildly antiseptic properties.

#### CHOLERA AND PLAGUE.

Besides the precautions already detailed, the disinfection and destruction of fomites are, of course, matters which must always be attended to by the nurse in charge of infectious cases. The specific bacillus of cholera is quickly destroyed by desiccation, but continues to multiply outside the body in the presence of moisture. On this account all bed-coverings and articles of clothing, &c., which have been soiled by the discharges from a case of cholera must be quickly and thoroughly disinfected or destroyed. The bacillus of cholera is rarely found in the matters vomited, but these should also be disinfected.

In such a highly infectious disease as plague, everything which has been in contact with the patient which can possibly be spared should be burned. In plague the disinfection of the sputum, and the immediate destruction of any dressings applied to discharging surfaces, are matters which need special attention. The disinfection of the bowel discharges should in plague be continued during the convalescence of the patient; the specific bacillus is reported to have been found in the fæces a month after the crisis of the illness had passed. The active part played by rats in the dissemination of plague needs scarcely to be more than mentioned here. In an infected locality, the dead bodies of these animals should always when possible be destroyed by burning; in the case of rats dying from the disease simple burial is dangerous.

Protection against cholera and plague by prophylactic injections has already been discussed.



## MALARIA.

If the nurse is at any time specially exposed to the poison of malaria, in addition to the careful use she makes of her mosquito net—a matter already fully detailed and insisted on as regards her patients—she should take a small dose of quinine daily. Three to five grains is a sufficient quantity, and the dose is one which may be continued for a month or two at a time without harm or inconvenience.

Properly regarded the mosquito net is not only a protection for the healthy, but an important means of isolating the sick. For if the mosquito could no longer obtain access to blood in which the parasite of malaria was circulating, its rôle in continuing the life of that parasite in its own body, and eventually transmitting it in an altered form to man, would be ended. It would indeed be well if it were possible that everyone in whose blood the malarial parasite was known to exist could be kept under cover till cured. Patients suffering from malaria should certainly have the full benefit of mosquito nets, both for their own sakes and for the sake of others.

It is very desirable that the nurse who goes abroad should acquire some knowledge of the mosquito and its habits. *Anopheles* is the name given to that variety of the insect which, so far as we know at present, is alone capable of infecting man with the parasite of malaria. If the nurse is able to recognise the *anopheles* larvæ, floating as they do horizontally on the surface of stagnant pools, she might, armed with a little Jeyes' fluid or kerosene oil, materially improve the sanitary condition of her immediate surroundings so far as malaria is concerned. In a malarious district however, and indeed wherever mosquitoes are at all troublesome, it is advisable that an addition of Jeyes' fluid or kerosene oil be made to all stagnant pools in the neighbourhood of dwelling houses, as a routine practice not necessarily dependent on any special knowledge of



the insect or its habits. These additions need not be large: if kerosene is used, the surface of the water should be covered with a thin layer of the oil, and a very small quantity will do this sufficiently: one part of Jeyes' fluid in 10,000 parts of water is said to kill the larvæ of both *culex* and *anopheles* in a few hours.

#### SMALL-POX.

Small-pox in hot climates is a disease which usually makes its appearance during the colder months. In China, where inoculation is still extensively practised among the natives, and the winter is chosen for the performance of the operation, the regular recurrence of small-pox in cold weather is certain. Prophylaxis by isolation where natives are concerned is at present impracticable. In the East the only protection against small-pox on which dependence can be placed is that conferred by efficient vaccination. The early vaccination of infants and the re-vaccination of adults are matters which need greater attention abroad than at home. The personal protection of the nurse, to be secured before she leaves England, has already been discussed.



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